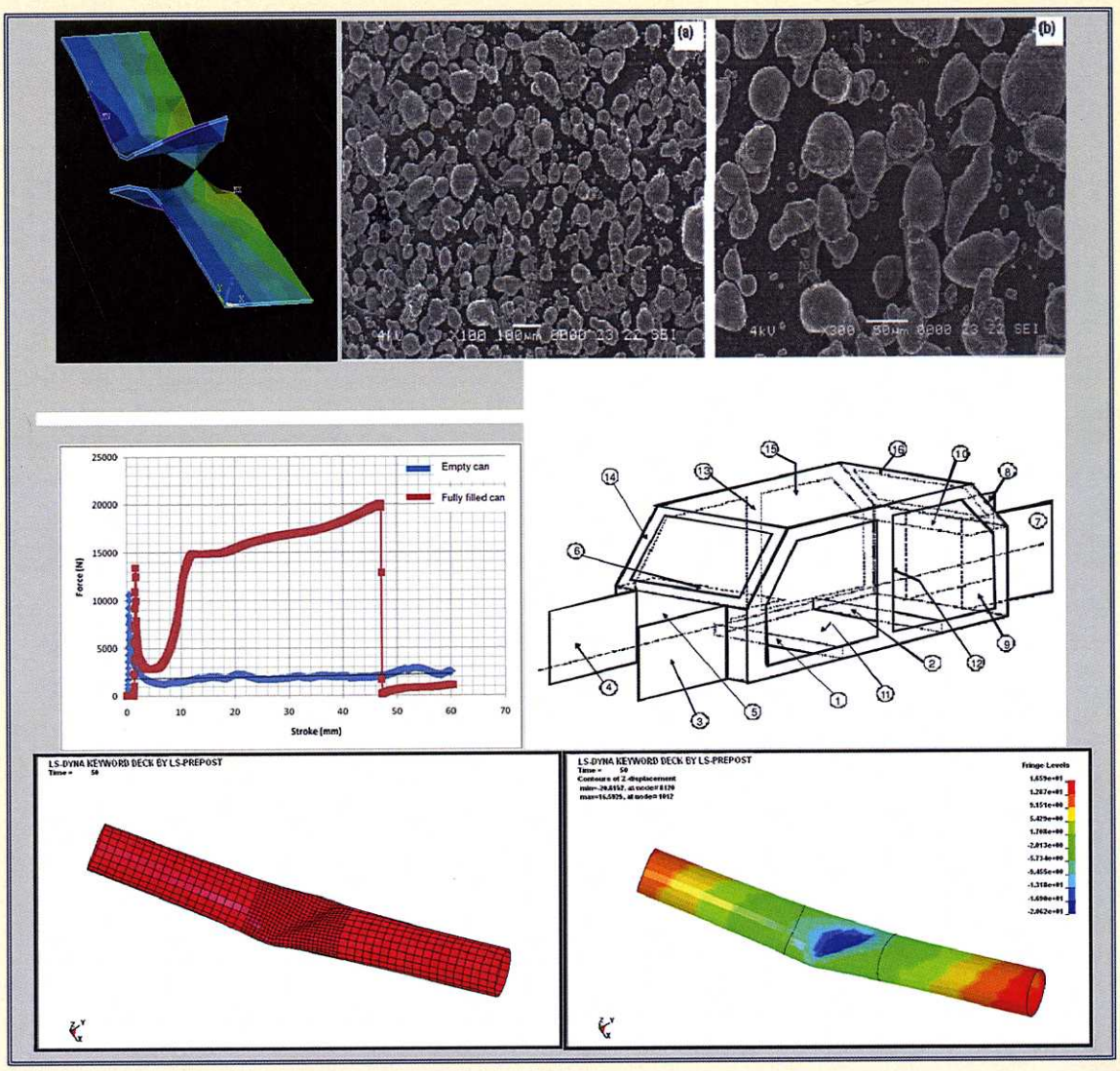
ADVANCED TOPICS IN MECHANICAL BEHAVIOR OF MATERIALS



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Meftah Hrairi

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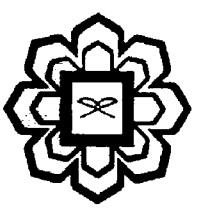

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Contents

Section 3 Design and Manufacturing

Section 4 Liquid Sloshing

37

EXPERIMENTAL RESULTS OF LIQUID SLOSH IN A CYLINDRICAL TANK WITH DIFFERENT FILL LEVELS

Qasim H. Shah, Hasan M.Abid, Adib B. Rosli

1. INTRODUCTION

The fundamental properties of slosh could be effectively investigated through laboratory experiments under controlled conditions. Such experiments can provide considerable insight into the fluid slosh and associated forces and moments. The majority of the experimental investigations on the fluid slosh have been conducted in model tanks which are small in size compared to the full scale tanks of cross-section area in the order of 3.5 m^2. The cross-sectional areas of the model tanks employed in the reported studies were in the order of 0.2 m^2 [1-3]. Since the similarity of sloshing fluid flows is very complex, the slosh behavior would be expected to differ for different tank sizes. Moreover, some of the reported slosh studies were limited to measurements of hydrodynamic pressure at given points or only one component of the slosh forces. The stability of a road tank vehicle, however, is strongly dependent on the resultant slosh forces and moments arising in all the translational and rotational axes.

2. RESULTS

2.1 Maximum values of strain gages

The complete graph of strain results versus time frame for one-by-four, half-filled, three-by-four and fully-filled with water are obtained from the experiment as follow,